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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
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| 10/034,030 | 12/19/2001 | Gwo-Ji Horng | JCLA8482 | 9497 |

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J.C. Patents, Inc.
4 Venture, Suite 250
Irvine, CA 92618

EXAMINER

TRINH, MINH N

| ART UNIT | PAPER NUMBER |
|----------|--------------|
| | 3729 |

DATE MAILED: 09/24/2003

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Please find below and/or attached an Office communication concerning this application or proceeding.

N.K

| | | |
|------------------------------|-----------------|--------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/034,030 | HORNG ET AL. |
| | Examiner | Art Unit |
| | Minh Trinh | 3729 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) Responsive to communication(s) filed on 21 July 2003.
- 2a) This action is FINAL. 2b) This action is non-final.
- 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) Claim(s) 1-14 and 26-43 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) Claim(s) _____ is/are allowed.
- 6) Claim(s) 1-5,11,12,26-29,33,34 and 37-43 is/are rejected.
- 7) Claim(s) 6-10,13,14,30-32,35 and 36 is/are objected to.
- 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) The specification is objected to by the Examiner.
- 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) The proposed drawing correction filed on _____ is: a) approved b) disapproved by the Examiner.
If approved, corrected drawings are required in reply to this Office action.
- 12) The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

- 14) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
a) The translation of the foreign language provisional application has been received.
- 15) Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

| | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) Paper No(s). _____ |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449) Paper No(s) _____. | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Election/Restrictions

1. Applicant's election without traverse of Group I, species A (claims 1-14, 26-43) in Paper No. 3 is deemed concurrence of the restriction requirement. The restriction requirement is made final. It is also noted that claims 1-14 and claims 26-43 related as combination and subcombination however, there is no burden on the examiner at this point.

Claim Rejections - 35 USC § 102

2. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

3. Claims 26 and 40 are rejected under 35 U.S.C. 102(b) as being anticipated by Araki et al (US 5,855,711).

As applied to claims 26 and 40, Araki et al teach a method of forming ceramic substrate comprising: providing a plurality of green tapes 20; forming a plurality of conductive openings 21 and the thermal conductive 51 (see Fig. 4); filling a metal paste into the conductive openings and the thermal conductive openings (as discussed as col. 5, lines 66-67); stacking the green tapes together, wherein the metal paste inside the conductive openings of every green tape is in contact with its neighboring metal paste within the conductive openings of the green tapes, the metal paste inside the thermal

conductive openings of each green tape is in contact with each neighboring metal paste inside the thermal conductive openings (see Fig. 5, laminated stacked); co-firing those green tapes and the metal paste to form a pre-substrate, wherein the pre substrate comprises an insulation structure, a plurality of thermal conductive plugs and conductive plugs; the pre substrate further comprises a top surface and a bottom surface (as discussed at col. 7, lines 42-54, see Fig. 5); forming a first metal film on the top surface of the pre substrate (see related embodiment of Figs. 8-9); forming a second metal film on the bottom surface of the pre substrate (see Fig. 9); patterning the first metal film to form a plurality of die pads and conductive traces, the die pads in contacted with the thermal conductive plugs and the conductive traces in contacted with the conductive plugs as shown in the Figs. 8-9 of Araki et al.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

5. Claims 27-29, 33, 34, 37-39, 42 and 43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki et al (US 5,855,711).

Regarding the limitations of claims 27-29. These limitations: stencil printing, sputtering deposition, etc., are also old and well known in the art. It would have been

obvious to use the method as described above onto the method invention of Araki et al in order to facilitate the fabricating process.

Regarding claim 37, with respect to the width of the thermal conductive opening is between 20 to 40 mm in. It would have been an obvious matter of design choice to choose any desired size and configuration of width of the thermal conductive opening since applicant has not disclosed that the claimed width as described above is a critical, patentably distinguishes feature or is for any particular purpose and it appears that the invention would perform equally well with the teaching as shown in each of the prior art references.

Regarding the limitations of claims 38, 39, 41 and 42. These limitations: stencil printing, sputtering deposition, etc., are also old and well known in the art. It would have been obvious to use the method as described above onto the method invention of Araki et al in order to facilitate the fabricating process.

Regarding claim 43, with respect to the width of the thermal conductive opening is between 20 to 40 mm in. It would have been an obvious matter of design choice to choose any desired size and configuration of width of the thermal conductive opening since applicant has not disclosed that the claimed width as described above is a critical, patentably distinguishes feature or is for any particular purpose and it appears that the invention would perform equally well with the teaching as shown in each of the prior art references.

6. Claims 1-5 and 11-12 are rejected under 35 U.S.C. 103(a) as being unpatentable over Araki et al (US 5,855,711) in view of Watanabe et al (US 6,326,651).

Araki et al teach a method of forming ceramic substrate with for mounting components or chips comprising: providing a plurality of green tapes 20; forming a plurality of conductive openings 21 and the thermal conductive openings 51(see Fig. 4); filling a metal paste into the conductive openings and the thermal conductive openings (as discussed as col. 5, lines 66-67); stacking the green tapes together, wherein the metal paste inside the conductive openings of every green tape is in contact with its neighboring metal paste within the conductive openings of the green tapes, the metal paste inside the thermal conductive openings of each green tape is in contact with each neighboring metal paste inside the thermal conductive openings (see Fig. 5, laminated stacked); co-firing those green tapes and the metal paste to form a pre-substrate, wherein the pre substrate comprises an insulation structure, a plurality of thermal conductive plugs and conductive plugs; the pre substrate further comprises a top surface and a bottom surface (as discussed at col. 7, lines 42-54, see Fig. 5); forming a first metal film on the top surface of the pre substrate (see related embodiment of Figs. 8-9); forming a second metal film on the bottom surface of the pre substrate(see Fig. 9); patterning the first metal film to form a plurality of die pads and conductive traces, the die pads in contacted with the thermal conductive plugs and the conductive traces in contacted with the conductive plugs (see Figs. 8-9, and the discussion at col. col. 7, lines 13-17). Araki et al do not teach the step of adhering a plurality of chips on the die pads and electrically connecting the chips to the conductive traces. However, Watanabe

et al teach step as described above as shown by Figs. 7 and 10 where the associated chips being adhered to the ceramic structure. Therefore, it would have been obvious to one ordinary skill in the art at the time the invention was made to apply the Watanabe's teaching of adhering a plurality of chips on the die pads and electrically connecting them to the conductive traces onto the method invention of Araki et al in order to form a multiplayer interconnection circuit assembly by using the known concepts, efficiency of operation would result (see col. 10, lines 6-11 of Watanabe et al).

Regarding claim 2, it is conventional and well known to form openings on the green tapes by using the punch machine. Further, Araki et al teach forming via by piercing col. 6, lines 41-42.

Regarding the limitations of claims 3-5. These limitations: stencil printing, sputtering deposition, etc., are also old and well known in the art. It would have been obvious to use the method as described above onto the method invention of Araki et al in order to facilitate the fabricating process.

Regarding claims 11, with respect to the width of the thermal conductive opening is between 20 to 40 mm in as recited in claim 11. It would have been an obvious matter of design choice to choose any desired size and configuration of width of the thermal conductive opening since applicant has not disclosed that the claimed width as described above is a critical, patentably distinguishes feature or is for any particular purpose and it appears that the invention would perform equally well with the teaching as shown in each of the prior art references.

Regarding claim 12, note that photo etching for patterning metal film is old and conventional used. It would have been obvious to use this method onto the method invention of Araki et al in order to obtain a circuit patterning.

Allowable Subject Matter

7. Claims 6-10, 13-14, 30-32 and 35-36 objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is a statement of reasons for the indication of allowable subject matter: That the prior art do not teach the process of planarizing after co firing the green tape as recited and described in details in dependent the claims 6-10 and 30-32 and further the aligning mark holes formed on the pre substrate as recited in details in claims 13-14 and 35-36 respectively. These limitations alone or in combination with other limitations are not suggested by the prior art.

Conclusion

8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Prior art references are cited for their teaching of method of manufacturing ceramic substrate.

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Minh Trinh whose telephone number is (703) 305-2887. The examiner can normally be reached on Monday -Thursday 8:00 am to 4:30 pm.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Peter Vo can be reached on (703) 308-1789. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-1148.



Patent Examiner

9/9/03
mt